

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking Regarding Policies,)	
Procedures and Rules for the California Solar)	R.06-03-004
Initiative, the Self-Generation Incentive Program)	
and Other Distributed Generation Issues.)	
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DECLARATION OF BENJAMIN S. COLLINWOOD

I, Benjamin S. Collinwood, declare as follows:

1. I am currently employed as Market Development Specialist for Sanyo Energy, (USA) Corporation. My business address is SANYO Energy (USA) Corporation, 2055 Sanyo Ave., San Diego, California, 92154.
2. I am currently responsible for product management for all H.I.T. (heterojunction with intrinsic thin layer) solar panels sold by Sanyo in the United States market. Since Sanyo initiated direct operations in the United States over three years ago, I have been responsible for North American solar sales operations. In the course of my work with Sanyo, I have gained in-depth knowledge of Sanyo solar panel technology and regularly speak at conferences and events as an expert about the solar market and Sanyo module technology. I am familiar with product design and rating systems used in the North American market.
3. Sanyo is a major participant in the worldwide market for photovoltaic panels, and has in the past three years made a major investment in the North American market, including a 22MW capacity silicon wafer manufacturing facility in the region of Los Angeles, CA. Sanyo has most recently focused on development and marketing of bifacial photovoltaic modules. Bifacial modules provide increased power generation compared to conventional single-sided panels because

the back-side of the panel generates electricity from diffuse light that has passed through the panel or is reflected off surrounding surfaces. These panels have been independently verified by Sandia National Labs in several independent tests validating their increased performance. I would be happy to provide this information if requested.

4. Bifacial panels produce from 0 to 20 percent more power (measured in kWh) than single-sided panels. The amount of increased generation depends on albedo, the amount of diffuse and reflected light, which varies depending on site characteristics and installation conditions, but averages approximately 10-15 percent.
5. The CEC AC rating process is not capable of determining system output when using the Sanyo bifacial solar panels. The CEC AC rating is based on Standard Test Condition (STC) ratings that only measure the output from one side of a panel. Since the STC rating system was developed without consideration of bifacial panels, STC ratings are measured with a solar simulator flash test of only one side of a photovoltaic panel. Output from the second side is ignored in the flash test. Because of this, the CEC AC rating process will systematically understate performance of all bifacial panels by approximately 10-15 percent.
6. We discussed this problem with CEC staff earlier in 2006, and CEC staff members have acknowledged this shortcoming of the CEC AC rating process. CEC staff members have also acknowledged that the CEC AC rating process cannot be adapted to account for back-side output from bifacial modules. When we discussed adapting the CEC rating calculation to account for the average

increased performance of bifacial modules, the CEC staff indicated that adjusting the CEC AC calculation equation could not appropriately capture the variation in performance due to installation conditions and site characteristics.

7. The CEC is correct in understanding that the back-side generation may vary by up to 20 percent, depending on whether the site and installation are optimized.

Basically, the back-side produces only minimal electricity if it is flat against a roof, but it is capable of producing up to 20% of the output of the front side if it is installed at an optimal site at an optimal angle, with high albedo. Assigning a value of zero to the output of the back-side makes the CEC AC rating completely erroneous for the vast majority of bifacial installations. In short, using a CEC AC rating to calculate rebates for bifacial panels results in underpayments for virtually all installations involving bifacial modules. This would also be the case if the CPUC adopts the proposed “system” AC approach.

8. Bifacial modules are a recent major innovation in the market. I am aware that the following companies are already manufacturing bifacial solar panels: Hitachi Ltd. (Japan), Origin Energy Australia (Sliver Technology), Solar Wind Europe (Russian/Spanish joint venture), and there may be others of which I am not yet aware. Bifacial panels can be used in a variety of solar installations including commercial, residential, new construction, and architectural applications. Examples of such are: carports, awnings, canopies, facades, trellises, deck coverings, balcony coverings, vertical installations (such as fences), architectural structures, and building integrated photovoltaics (BIPV). In my opinion, bifacial modules will constitute a growing market share in the future.

9. If California uses an incentive structure that completely ignores the significantly higher output level of bifacial panels, then marketers and customers will have no incentive to use this improved product in the California market.
10. Performance-based incentives that are based on actual metered output will correctly reflect differences in technology and site specific characteristics and appropriately reward systems that generate more electricity per unit. I believe that it is extremely important that the California Solar Initiative adopt an incentive structure as soon as possible that is based on metered output.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on May 24, 2006, at 2055 Sanyo Ave, San Diego, CA 92154.

By: Benjamin S. Collinwood

Benjamin S. Collinwood